

SECTION 04720

Cast Stone

STROMBERG
Architectural Products Inc.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural cast stone fabrications as indicated on the drawings.

1.2 RELATED SECTIONS

- A. Section 03490 - Glass Fiber Reinforced Concrete.
- B. Section 05500 - Metal Fabrications: Supplementary supports for large items.
- C. Section 06100 - Rough Carpentry: Supplementary supports for large items.
- D. Section 06610 - Glass Fiber Reinforced Plastic Fabrications.
- E. Section 07900 - Joint Sealers: Sealant materials for open joints.
- F. Section 09235 - Glass Fiber Reinforced Gypsum Fabrications.
- G. Section 09900 - Paints and Coatings: Field painting and sealing prior to painting.

1.3 REFERENCES

- A. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 1997a.
- B. ASTM A 184/A 184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement; 1996.
- C. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1997.
- D. ASTM A 497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement; 1997.
- E. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.
- F. ASTM C 31/C 31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field; 1998.
- G. ASTM C 33 - Standard Specification for Concrete Aggregates; 1999a.
- H. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1999.

- I. ASTM C 150 - Standard Specification for Portland Cement; 1999a.
- J. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 1991 (Reapproved 1997).
- K. ASTM C 642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 1997.
- L. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete; 1999.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Manufacturer's qualifications.
- C. Evidence that the cast stone products proposed have been exposed to weather for at least one year without degradation.
- D. Shop Drawings: Provide drawings showing dimensions, layout, joints, details, reinforcing, anchors and inserts, and interface with adjacent work.
 - 1. Include field measured dimensions of the spaces where items are to be installed, if critical to proper installation.
 - 2. Include setting mark of each unit and its location in the structure.
 - 3. Provide drawings of at least as large scale as the architectural drawings.
- E. Selection Samples: Two samples, minimum size 12 inches (300 mm) square, representing proposed color and texture, with description of cement, aggregate, and pigments necessary to produce the sample.
- F. Verification Samples: After approval of selection samples, provide two more samples, minimum size 12 inches (300 mm) square, representing selected color and texture, with description of cement, aggregate, and pigments necessary to produce the sample.
- G. Samples of Pointing Mortar: Two samples of sufficient size to review appearance.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Having minimum of five years experience in manufacture of cast stone, and having adequate facilities and capacity to produce the quantity and quality specified in the time frame required.
- B. Installer Qualifications: Regularly engaged and experienced in the installation of cast stone or precast concrete units, employing experienced masons.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Transport, lift, and handle units with care, avoiding excessive stress and preventing damage; use appropriate equipment.
- B. Store units off the ground on material that will not stain the stone; if long term storage is necessary, cover with polyethylene or other non-staining waterproof material.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Stromberg Architectural Products Inc; PO Box 8036, I-30 West, 4400 Oneal, Greenville, TX 75404. ASD. Tel: (903) 454-0904. Fax: (903) 454-3642. Email: sales@strombergarchitectural.com. www.strombergarchitectural.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MATERIALS

- A. Architectural Cast Stone: High density concrete; designed by manufacturer to achieve specified strength, color, and texture, desired handling characteristics, and to resist effects of temperature changes.
 - 1. Thickness: 2-1/2 inches (63.5 mm), minimum.
 - 2. Compressive Strength: 5000 psi (34 MPa), minimum, at 28 days, when tested in accordance with ASTM C 39/C 39M using specimens made in accordance with ASTM C 31/C 31M, determined by average of 3 specimens.
 - 3. Water Absorption: 3% to 8%, maximum, when tested in accordance with ASTM C 642.
 - 4. Weather Resistance: Mix design proven by experience to be resistant to degradation by weather.
 - 5. Reinforcing: Cross-section amounting to at least 1/4 of 1 percent of the cross-sectional area of the unit; if unit is more than 12 inches (305 mm) in any dimension, provide reinforcement in both directions to resist effects of temperature variations; minimum cover of concrete equal to two times reinforcing diameter; see drawings for additional requirements.
 - 6. Color and Texture: To match Architect's sample, when viewed with unaided eye in good typical lighting at distance of 10 feet (3050 mm); no obvious repairs or chips when viewed at distance of 20 feet (6100 mm).
 - 7. Pigment: Achieve desired color using only cement and aggregate to extent possible; if pigment is required, limit quantity to 10 percent by weight of cement.
 - 8. Provide suitable wash on exterior sills, copings, projecting courses, and other pieces with exposed top surface, raised fillet at back of window sills, and drip under outer edge of projecting pieces and soffit units.
 - 9. Variation in Panel Height and Width from Dimensions Indicated on Drawings: Plus 1/16 inch (1.5 mm) and minus 1/8 inch (3 mm), maximum.
 - 10. Variation in Panel Length from Dimensions Indicated on Drawings:
 - a. Length up to 24 inches (610 mm) Plus 1/16 inch (1.5 mm) and minus 1/8 inch (3 mm), maximum.
 - b. Length 24 to 60 inches (610 to 1525 mm): Plus and minus 1/8 inch (3 mm), maximum.
 - c. Length 60 to 120 inches (1525 to 3050 mm): Plus 1/8 inch (3 mm) and minus 3/16 inch (5 mm), maximum.
- B. Cement: ASTM C 150 Type I or II white Portland cement.
- C. Fine Aggregate: Carefully graded and washed natural sand, or manufactured granite, quartz, or limestone sand, complying with ASTM C 33 with the exception that gradation may vary to achieve desired finish and texture.

- D. Coarse Aggregate: Carefully graded and washed natural gravel, or crushed graded stone such as granite, quartz, limestone, or other durable stone, complying with ASTM C 33 with the exception that gradation may vary to achieve desired finish and texture.
- E. Pigments: Inorganic, natural or synthetic iron oxide pigments complying with ASTM C 979 and guaranteed by manufacturer to be lime proof. Exception: Cement grade carbon black pigment is permitted.
- F. Reinforcing: As indicated on drawings and as required by design.
 - 1. Units Exposed to Weather: Provide galvanized or epoxy coating on reinforcing 5/8 inch (16 mm) in diameter or less unless covered by at least 2 inches (50 mm) of concrete.
 - 2. Bars: ASTM A 615 Grade 40 or 60, size as indicated on drawings.
 - 3. Wire Reinforcement: ASTM A 82.
 - 4. Welded Wire Fabric: ASTM A 185 or A 497.
 - 5. Bar Mats: ASTM A 184/A 184M.
- G. Setting Mortar: Type S, non-staining.
- H. Pointing Mortar: 1 part ASTM C 91 cement, 1 part ASTM C 207 Type S hydrated lime, 4 parts clean washed sand.
 - 1. Color: White.
 - 2. Color: _____.
- I. Setting Anchors: Commercially available stone anchors, dowels, inserts and other anchoring devices; made of zinc alloy, hot-dipped galvanized steel, brass, or Type 302 or 304 stainless steel.
- J. Joint Sealer and Accessory Materials: As specified in Section 07900.

2.3 SOURCE QUALITY CONTROL

- A. Design concrete mix to achieve specified requirements and submit specified samples.
- B. Prepare a mock-up unit representing the most common shape required on the project.
 - 1. Manufacture the full size unit in color and texture required.
 - 2. Notify Architect when mock-up unit is ready for inspection.
 - 3. Architect will inspect only for color, texture, and overall appearance complying with specified requirements.
 - 4. Upon approval of mock-up unit, manufacture remaining units to match using same materials and mix design.
- C. Take specimens during manufacture and test as specified; minimum of 1 specimen per 1000 cubic yards (765 cu m) of concrete. Replace units that do not meet requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed; verify that substrates are plumb and true.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- C. Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Architect and wait for instructions before beginning installation.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install supplementary temporary and permanent supports as required for proper installation.

3.3 INSTALLATION

- A. Install in accordance with shop drawings, applicable code and manufacturer's recommendations, plumb and true to line; shim where necessary.
- B. Set units using mortared masonry techniques except where metal anchors are indicated on drawings or shop drawings:
 - 1. Wet stone thoroughly just prior to setting by drenching with clean water.
 - 2. Set units in full bed of mortar with vertical joints slushed full.
 - 3. Rake out all joints to depth of 3/4 inch (19 mm) before mortar sets.
 - 4. Remove mortar splashes and smears immediately using clean water and sponge.
 - 5. Leave vertical joints open at cornices, copings, projecting courses, and other generally horizontal areas.
 - 6. Leave bed joints open at lugged sills and similar units, with only ends embedded in mortar.
- C. Anchored units: Install anchors, dowels, and other fastening devices as indicated.
 - 1. Level units and adjust for proper joint clearance.
 - 2. Fill anchor, dowel, and other holes full with mortar.
- D. Pointing Mortar Joints:
 - 1. Scrub entire surface, removing excess mortar, using clean water and fiber brushes.
 - 2. Dampen raked joints and install pointing mortar, compress mortar firmly into joint, and tool to concave surface, and remove excess mortar.
 - 3. Do not perform pointing in freezing weather or when exposed to hot sun unless precautions are taken to provide proper curing of mortar.
 - 4. Replace cracked pointing mortar.
- E. Open Joints: Install sealant backer, prime joint surfaces, and install sealant with tooled joint surface matching pointed joints; use materials and methods specified in Section 07900.
- F. Clean entire surface after pointing mortar has set; use only water and fiber brushes.

3.4 CLEANING AND PROTECTION

- A. Protect installed units from mud, dirt, cement, paint, sealant, and other materials until completion of project; clean soiled units.
- B. To clean, use fiber brushes and clean water only; DO NOT clean with acid or commercial cleaners unless specifically approved by manufacturer.

- C. Repair or replace damaged units and units that cannot be adequately cleaned before Substantial Completion; for repair, use only mechanics and techniques approved by manufacturer.

END OF SECTION